

CLAIMS

- 1 1. A web-handling cylinder comprising a cylinder having a circumferential surface
2 and at least one sensor associated with the circumferential surface for detecting a force
3 applied by a web against the surface.
- 1 2. The cylinder of claim 1 wherein the at least one sensor determines a normal force
2 exerted by the web at a point on the cylinder's circumferential surface.
- 1 3. The cylinder of claim 1 wherein the at least one sensor comprises a force-
2 sensitive resistor.
- 1 4. The cylinder of claim 1 wherein the at least one sensor comprises a load cell.
- 1 5. The cylinder of claim 1 wherein the at least one sensor comprises a piezo-electric
2 sheet based sensor.
- 1 6. A web-handling system comprising:
2 a) a cylinder including a circumferential surface and a sensing device comprising
3 at least one sensor associated with the circumferential surface for detecting a force
4 applied by a web against the surface; and
5 b) an actuation device, responsive to the detected force, for adjusting the force
6 applied by the web against the circumferential surface of the cylinder.
- 1 7. The system of claim 6 wherein the sensing device further comprises a processor
2 for receiving an input from the at least one sensor, processing the input and sending an
3 output to the actuation device.
- 1 8. The system of claim 6 wherein the actuation device increases the force applied by
2 the web against the circumferential surface of the cylinder in response to detected web
3 slippage or loss of contact between the web and the circumferential surface of the
4 cylinder.

1 9. The system of claim 6 wherein the sensing device, together with the actuation
2 device, maintains a set value for the force applied by the web against the circumferential
3 surface of the cylinder.

1 10. The system of claim 9 wherein said set value comprises a range.

1 11. The system of claim 6 wherein the actuation device comprises at least one
2 positioning device that changes the position of at least one of a web-supply spool and a
3 web-uptake spool.

1 12. The system of claim 10 wherein the positioning device changes spool position
2 along a line.

1 13. The system of claim 10 wherein the actuation device comprises a first positioning
2 device that changes the position of the web-supply spool and a second positioning device
3 that changes the position of the web-uptake spool.

1 14. The system of claim 10 wherein the cylinder further comprises a cavity, and the
2 web-supply spool and the web-uptake spool are disposed in the cavity.

1 15. The system of claim 10 wherein the cylinder further comprises multiple cavities,
2 and the web-supply spool and the web-uptake spool are disposed in separate cavities.

1 16. The system of claim 6 wherein the actuation device adjusts the rotation of the
2 cylinder.

1 17. The system of claim 6 wherein the actuation device adjusts the rotation of at least
2 one of a web-supply spool and a web-uptake spool.

- 1 18. The system of claim 6 wherein the at least one sensor is selected from the group
2 consisting of a force-sensitive resistor, a load cell and a piezo-electric sheet based sensor.
- 1 19. A method for detecting a force applied by a web against a cylinder surface, the
2 method comprising associating at least one sensor with a circumferential surface of a
3 cylinder.
- 1 20. The method of claim 19 wherein the at least one sensor comprises a force-
2 sensitive resistor.
- 1 21. The method of claim 19 wherein the at least one sensor comprises a load cell.
- 1 22. The method of claim 19 wherein the at least one sensor comprises a piezo-electric
2 sheet.
- 1 23. A method for adjusting a force applied by a web against a cylinder surface, the
2 method comprising the steps of:
3 a) associating a sensing device comprising at least one sensor with a
4 circumferential surface of a cylinder for detecting a force applied by a web against the
5 surface; and
6 b) adjusting the force applied by a web against the circumferential surface of the
7 cylinder in response to the force detected by the at least one sensor.
- 1 24. The method of claim 23 further wherein the sensing device further comprises a
2 processor for receiving an input from the at least one sensor, processing the input and
3 sending an output to the actuation device.
- 1 25. The method of claim 23 wherein the adjusting step comprises changing the
2 position of at least one of a web-supply spool and a web-uptake spool.

1 26. The method of claim 25 wherein the web-supply spool and the web-uptake spool
2 are disposed in one cavity in the cylinder.

1 27. The method of claim 25 wherein the web-supply spool and the web-uptake spool
2 are disposed in separate cavities in the cylinder.